Essential role for Notch signaling in restricting developmental plasticity.

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Public Summary:
We report that Notch signaling is essential for the switch from developmental plasticity to commitment during worm embryogenesis. The Notch receptors act to set a memory state that affects commitment of cells arising from the major ectodermal progenitor (AB blastomere) several cell divisions later, thereby preventing their forced reprogramming by an endoderm-determining transcription factor. In contrast to Notch-dependent cell fate induction, this activity is autonomous to the AB lineage, is independent of the known cell fate-inducing Notch ligands, and requires a putative secreted Notch ligand. Thus, Notch signaling promotes developmental commitment by a mechanism that is distinct from that involved in specifying cell fates.

Scientific Abstract:
We report that Notch signaling is essential for the switch from developmental plasticity to commitment during Caenorhabditis elegans embryogenesis. The GLP-1 and LIN-12 Notch receptors act to set a memory state that affects commitment of cells arising from the major ectodermal progenitor (AB blastomere) several cell divisions later, thereby preventing their forced reprogramming by an endoderm-determining transcription factor. In contrast to Notch-dependent cell fate induction, this activity is autonomous to the AB lineage, is independent of the known cell fate-inducing Notch ligands, and requires a putative secreted Notch ligand, Delta Serrate Lag-3 (DSL-3). Thus, Notch signaling promotes developmental commitment by a mechanism that is distinct from that involved in specifying cell fates.